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# Analysis of Operational Delay and Additional Investment Costs, As An Investment Consideration (Case In Malang Pandaan Toll Road)

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## ABSTRACT

**Purpose:** This paper aims to Analysis of Operational Delay and Additional Investment Costs, As an Investment Consideration: Case in Malang Pandaan Toll Road.

**Design/methodology/approach:** The method used is statistic-descriptive and the design used is cross sectional.

**Findings:** 2 hypotheses are while the other is accepted.

**Research limitations/implications:** Variables considered in this study are electronic word of mouth, brand image, brand trust, and interest in saving. The scope of work of the Pandaan Malang Toll Road project has a length of 38 + 488 km, passing through two regions in Figure 1.

**Practical implications:** Results show that from the 2 hypotheses proposed.

**Originality/value:** This paper is original.

**Paper type:** This paper can be categorized as a case study.

**Keyword:** brand image; brand trust; electronic word of mouth; saving interest

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## I. INTRODUCTION

Pasuruan is a strategic area that connects two biggest cities in East Java Province, Surabaya and Malang. Malang has a popular tourist attraction and Surabaya is the capital of the center of government and industry in East Java. The provincial arterial road that bridges the two cities is mostly in the Pasuruan Regency area which runs from the southern end (Purwodadi) to the northern end (Pandaan). The Surabaya - Malang route is always busy every day, both weekdays and holidays. Where the vehicle volume continues to increase and expand while the road segment does not increase in width so that congestion occurs at certain points along the arterial road.

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*Analysis of Operational Delay and Additional Investment Costs, As an Investment Consideration: Case in Malang Pandaan Toll Road*

Dina Yunanda, Christiono Utomo, Maranatha Wijayaningtyas

Page | 168

Severe traffic jams occur at a number of points such as Purwosari T-junction (Pasuruan), Lawang Market, Singosari, and Karanglo T-junction (Malang). So the solution of all this is the construction of a toll road that will later connect Pandaan - Malang so that it becomes connected Surabaya - Malang. Because of the level of traffic density, then PT. Jasa Marga, together with PT. PP (Persero) Tbk and PT SMI joint venture capital established a company called PT. Jasa Marga Pandaan Malang (PT. JPM) in 2016 and took part in a tender in the Government as the Pandaan Malang toll investor was determined as the winner so that it began planning the construction of the Pandaan Malang Toll Road whose construction was completed in November 2018. In the middle of the trip it turned out that the land acquisition was late so that the completion time of the construction was backward to June 2019, while on March 6, 2019 the activities at sta 37 + 700 as far as approximately 1km were stopped from work activities in the field due to the discovery of the Sekaran Site which was submitted by the Singosari Tourism Office so that the mainroad location was shifted not where the Sekaran Site was found which means that there would be additional time for the design and construction process and additional costs for land acquisition and new work methods (elevated above the river).

Investment is essentially the placement of a number of capital related to risk, and uncertainty because the costs incurred by investors today can only be felt in the future where the expectations of investors benefit in the future, especially investments such as toll roads that absorb capital and risk which is quite high (Suteja, 2016).

From the explanation above related to investments made by PT. Jasa Marga Pandaan Malang, research is needed to determine the maximum limit of changes in delays and investment costs that affect investment decisions on the Pandaan Malang toll road.

## **A. Previous Study**

### **Toll Roads and Principles of Operation**

Toll roads are public roads that are part of the road network system and as a national road the users are required to pay tolls. (Undang-undang No. 15 of 2005). The purpose of the toll road development is to expedite traffic, shorten time, advance developing areas, increase distribution of goods and services in equitable development services, ease the burden of government saving vehicle operating costs (BOK), expand employment, interregional links, and reduce traffic jams.

The types of vehicles that are permitted to use toll roads are regulated in article 38 of Peraturan Pemerintah No. 15 of 2005. Toll roads are only intended for road users who use four or more wheeled motorized vehicles that are grouped according to the type of transportation and their capacity as shown in the classification of vehicle classification on the toll road in Table 1.

Table 1. Vehicle Classification on Toll Roads

Group	Vehicle Type
I	Sedan, Jeep, Pick-up, Minibus, Medium Truck, Medium Bus, Large Bus
II	Large 2 axis truck
III	Large 2 axis truck
IV	Large 2 axis truck (Trailer Truck)
V	Truck Large trucks 5 axes or more (Trailer)

Source: PT. Jasa Marga 2007

## Toll Roads and Principles of Operation

Investment is essentially the placement of a number of funds in the hope of obtaining future profits (Fahmi, 2006). In its activities, according to William F. Sharpe (2005: 1) investment is generally known in two forms, namely, first real investment (tangible) generally involves tangible assets, such as land, machinery, or factories. Second, financial investment (finance) involves written contracts, such as ordinary shares and bonds. The toll road development itself is expected to provide a return in the future is one of the real investments.

Decisions in the investment field are very important because they will have a large influence on the company's development in the future. To determine an investment decision in terms of financial aspects, it is necessary to measure several criteria. The criteria commonly used to determine the feasibility of a business or investment are: (1) Payback Period (PP), (2) Average Rate of Return (ARR), (3) Net Present Value (NPV), (4) Internal Rate Of Return (IRR), (5) Profitability Index (PI), and (6) various financial ratios such as liquidity, solvency, activity and profitability (Riyanto: 1995; Sulindawati et.al, 2016). Whereas for this thesis we will analyze only 2 indicators, namely Net Present Value (NPV) and Internal Rate of Return (IRR).

Suteja et.al, (2016) explained that investment decisions are an important factor in the company's financial function. Fama (1978) states that the value of a company is solely determined by investment decisions. This opinion can be interpreted that the investment decision is important, because in order to achieve the company's objectives, namely maximizing shareholder prosperity will only be generated through the company's investment activities, taking into account 2 things, among others:

1. Return, which is the level of profit obtained from investment, which is the sum of: Yield (cash flow / income received periodically) and Capital gain (increase / decrease in investment prices).  
Total return = Yield + Capital gain.
2. Risk. When investing in addition to expecting certain returns, investors must also bear the level of risk, in the context of investment risk management is a deviation / difference between expected returns and returns that are actually received by investors (actual returns).

Where the source of risk comes from:

- a. Business risk: This risk is the risk in running a business that is related to certain characteristics of a business.
- b. Inflation risk: An increase in inflation in general will reduce the purchasing power of money spent by the public.
- c. Financial risks: Will arise when the company decides to use debt as a source of financing.
- d. Exchange rate risk: i.e. fluctuations in the exchange rate of the domestic currency (the country of origin of the investor) with the value of other countries' currencies.

An investment requires large funds, namely the use of funds that can affect the company in the long run, so it needs to be done an analysis beforehand in order to get the right decision. In simple terms the decision itself can be defined as the process of tracing the problem that starts from the background of the problem, identification of the problem, to the formation of conclusions or recommendations. That recommendation is used and used as a basis for decision making. Investment development in a project can suffer losses if something goes wrong in terms of: planning, analyzing the market, doing material estimates, and in terms of recruiting workers. Investment feasibility analysis must be done to avoid investment mistakes in a project that is not profitable (Fahmi, 2006).

## **Investment Cost**

The definition of investment costs here is divided into two namely (Kodoatie, 1994):

1. Capital Cost is the sum of all expenses needed starting from pre-study until the project is completed.

Where capital costs are divided into two parts, namely:

- a. Direct Costs: Direct costs for the construction of a project. All these costs will later be the construction costs offered to the contractor except the cost of land acquisition borne by the owner (owner).
- b. Indirect costs

These indirect costs have three components, namely:

- a) Unexpected contingencies of direct costs. For example, the cost of rising prices in the future. Where this cost is a percentage of direct costs example 5%, 10% etc. depending on the owner and planner.
  - b) Engineering costs (engineering costs) are costs for making designs ranging from initial studies, pre-feasibility studies, feasibility studies, planning costs and supervision costs during the time of construction.
  - c) Interest (interest) from the initial time period of planning to physical implementation, interest affects the direct costs, possible costs and technical costs so it must be calculated.
2. Annual Cost is the amount of money spent during the use of the project from the contractor's handover to the owner until the operational life of the project is complete. The annual fee consists of 3 components, namely:

- a) Interest causes changes in capital costs due to interest rates during the operational life of the project completed. The amount is different from the interest during the construction period of the project.
- b) Depreciation or Amortization where the two terms are almost the same but have different functions. Depreciation is the depreciation of an item due to the use and damage of the object. Amortization is a payment within a certain period (annual for example) so that the debt that will be paid in full at the end of the period.
- c) Operation and Maintenance Costs in order to be able to meet the life of the project in its operation, the costs for operation and maintenance of the project are required.

### **Net Present Value (NPV)**

Net present value (NPV) is the difference between a series of future receipts after being valued at this time (using factor discounts) and current (investment) expenditures. This method calculates the difference between the present value of an investment and the present value of net cash receipts (operational or cash flow) in the future. To calculate the present value, it is necessary to first determine the interest rate that is considered relevant (Sulindawati et al, 2016).

Investment decisions with the NPV indicator are as follows:

1. If the NPV is positive (greater than the present value of the investment) then a project plan can be implemented.
2. If the NPV is negative (smaller than the present value of the investment) then a project plan should not be carried out.

NPV stated by formula:

$$NPV = \sum_{t=1}^n \frac{FCF1}{(1+k)^t} - I_0 \dots \dots \dots (1)$$

FCF1 : Annual free cash flow in period t

k : The discount rate, as the desired rate of return or Cost of Capital

$I_0$  : Initial cash disbursement

n : Project age

### **Internal Rate of Return (IRR)**

Internal Rate of Return (IRR) is used to calculate the interest rate that equates the present value of investment with the present value of net cash receipts in the future (Sulindawati et al, 2016).

Internal Rate of Return (IRR) is the return rate of an investment at which time the return rate of investment is 0 (zero). An investment is said to be feasible and profitable to run if the IRR is greater than the assumed cost of capital (WACC).

Investment decisions with IRR indicators are as follows:

1. If the IRR is greater than the discount rate, a project is feasible or profitable.
2. If the IRR is less than the discount rate of a project that is not feasible to run or means loss.

This IRR can be stated by the formula:

$$I_0 = \sum_{t=1}^n \frac{FCF_t}{(1+IRR)^t} \dots\dots\dots(2)$$

FCF<sub>t</sub> : Annual free cash flow in period t

I<sub>0</sub> : Initial cash disbursement

n : Project age

IRR : Internal Rate of Return of the project

## Cash Flow

Cash flow statements are prepared with the aim of providing information about cash receipts and disbursements of a company during a certain period and provide information about operating, investing and financing activities. (Sulindawati et al, 2016).

There are three things that cause investment failure on toll roads, namely the ability of funding, regulations that do not support, and the level of financial returns. This happens because the characteristics of investment in toll roads are long-term and require very large investments with a > 29 year buyback period and a concession period of between 35 - 40 years. The biggest investment expense in the form of land, construction and equipment occurred at the beginning of the concession period, while new revenues began to grow at the beginning of the toll road operation. The results of toll revenues at the beginning of the 5-7 years of operation are not enough to return loans to banks (deficit cash flow).

Some of the main parameters in toll road investment that are outside the investor's control such as the time and cost of land acquisition, because in accordance with the Law that land acquisition is the Government's responsibility in this case represented by the Ministry of Public Works, so that if the land acquisition process exists experiencing problems, it will cause the project to be late. Then the issue of tariff adjustments (time and amount) which for adjusting toll tariffs is the Government's right to increase or not, is also very dependent on the problem of rising prices and the political situation in this country.

## Sensitivity Analysis

Sensitivity analysis is done by changing the value of a parameter at a time to further see how it affects the acceptability of an investment alternative. Factors that usually change and changes that can affect decisions in technical economics studies are investment costs, cash flow, residual value, interest rates, and investment life. (Pujawan, 2008).

Sensitivity analysis is useful to determine the effect of changes in production on changes in the performance of production systems in generating profits by calculating IRR, NPV, B / C ratio, and payback period on some changes that might occur (Nurhayati, 2017).

In this thesis, the Sensitivity Analysis is carried out on two factors namely Net Present Value (NPV) and Internal Rate of Return (IRR), then a graph that connects:

- 1) The relationship between NPV and income.
- 2) Relationship between NPV and Investment Costs.

## **Previous Research Review**

In previous studies, there were several studies conducted by several researchers related to toll road investment. From the results of the literature study conducted, it can be displayed 5 studies related to toll road investment as shown in table 2.3.

Listyaningsih and Utomo (2014) have conducted research on the Effect of Late Land Acquisition on Investment Decisions of the Surabaya - Mojokerto Toll Road Project. The contents of the journal are to find out how many years of delay due to land acquisition can be tolerated by investors, so that the maximum delay is 19 years, if more than 19 years the investment is not profitable.

Fitriani et. al (2006) has observed that investment in toll roads is a long-term investment and has a very high risk, so an in-depth study needs to be done. In his research for the Cisumdawu Phase I toll road project, the Cileunyi - Tanjungsari Sumedang Section using the NPV at risk calculation method, the results show that a minimum NPV of Rp 564.3 billion and a maximum NPV of Rp 3,827 billion.

Karsaman et.al (2014) has conducted a study on funding using the sharia system for investment on the Cikampek-Palimanan toll road and the result is that using the sharia system is more economical than the conventional system, because the sharia system has a risk sharing to funders. The results of his research obtained Sharia NPV value: Rp. 3,609 billion, IRR: 22.99% while conventional NPV: Rp. 2,188 billion, IRR 22.15%.

Roswita and Hartanto (2015) have conducted research on the feasibility of infrastructure investment in the Cikampek - Padalarang toll road by using NPV and IRR calculations. In this study, the NPV value: Rp. 267.6 billion and IRR 16.1%.

Manaf and Sitorus (2012) have conducted a study on the feasibility of investing in the Depok-Antasari toll road using NPV and IRR studies to find out whether the investment on the Depok-Antasari toll road is profitable or not. And the results of his research that the toll road is profitable because it has an NPV value of Rp. 729 billion and an IRR value of 19.26%. For this research, we do a re-review of how much investment value should be spent by PT. Jasa Marga Pandaan Malang and how many delays for the operation of a Pandaan Malang toll road are related to the decision to invest with an indication of Net Present Value (NPV) and Internal Rate of Return (IRR) with the Sensitivity Analysis method.

## **B. Hypotheses**

**H1:** The relationship between NPV and income

**H2:** The relationship between NPV and investment costs

## II. METHODOLOGY

### Object Discription

PT. Malang Pandaan Jasamarga overall investment costs Rp. 5,993,597,000,000 or Rp.5,993 trillion with a joint venture capital of three companies namely: PT. Jasamarga 60%, PT PP 35% and PT. Sarana Multi Infrastruktur 5%. The scope of work of the Pandaan Malang Toll Road project has a length of 38 + 488 km, passing through two regions in Figure 1, namely: Pasuruan Regency and Malang Regency with the division:

- 1) Section 1: Pandaan – Purwodadi (STA. 0+000 until STA. 15+475)
- 2) Section 2: Purwodadi -Lawang (STA. 15+475 until STA. 23+525)
- 3) Section 3: Lawang - Singosari (STA. 23+525 until STA. 30+625)
- 4) Section 4: Singosari – Pakis (STA. 30+625 until STA. 35+375)
- 5) Section 5: Pakis – Malang (STA. 35+375 until STA. 38+488).



Figure 1. Map of the location of the toll road project area



## Work Steps

The following is a flow chart of the stages of work that can be seen in Figure 2.

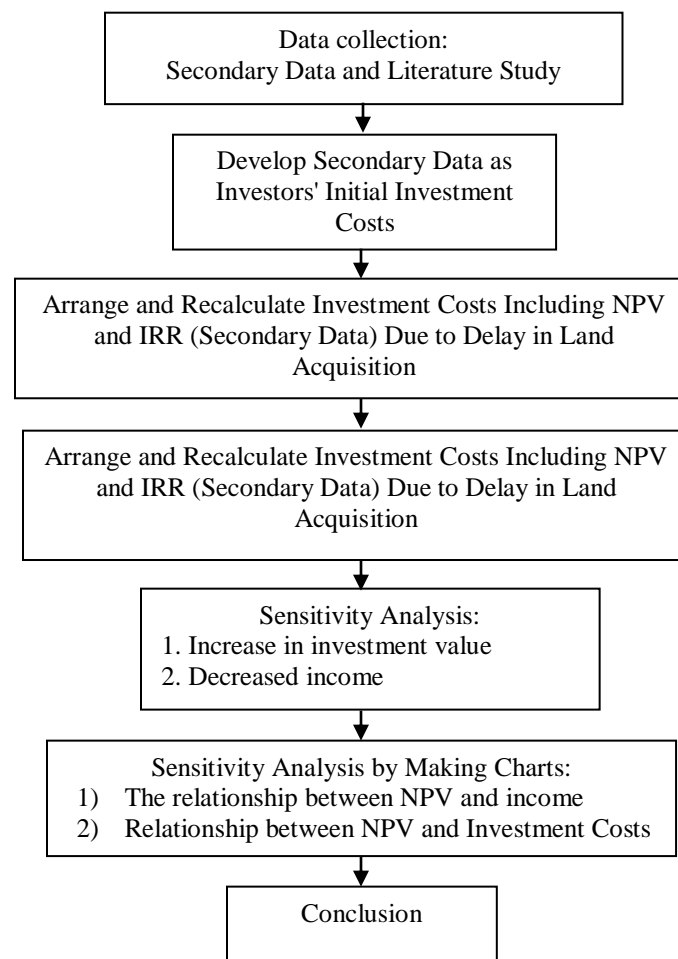


Figure 2. flow chart of the stages of work

### III. RESULTS AND DISCUSSION

#### Initial Investment Cost

Initial investment costs are obtained by processing data obtained from investors (PT Jasamarga Pandaan Malang) in the form of investment value, LHR, toll rates per km and

No	Work Item	Amount (Rp)
1	Initial Design fee	76.160.000.000
2	Construction cost	3.808.000.000.000
3	Toll Equipment	76.160.000.000
4	Supervision + PMI	76.160.000.000
5	Contingency cost	705.488.000.000
6	Overhead cost during construction	19.040.000.000
7	VAT (for costs arising from points 1 to 6 of 10%)	466.581.000.000
8	Upfront Fee PII & Land / interest syndication from banks for land acquisition loans	8.500.000.000
9	Interest during construction	629.491.000.000
10	Bank interest on DDT (Financial Fee)	104.476.000.000
	Initial Investment	5.970.055.000.000
	Construction Margin	23.541.581.743
	Total Initial Investment Cost	5.993.597.000.000

cash flow plans. These data will be further known how much the added value of the loss (additional investment value) borne by PT. Pandaan Jasamarga Malang, due to delays in land acquisition and shifting toll road sections due to the discovery of the sekaran site and what is the maximum delay allowed for operation of a Pandaan Malang toll road in terms of investment as an indication of investment decision making. The indications used are NPV and IRR values. Following are the results of data processing in the form of total investment costs in Table 3

#### Investment Costs Due to Delay

At the implementation stage in the field, the Pandaan - Malang toll road project is planned to be completed within 2.5 years, according to the contract to the contractor PT. PP (Persero) Tbk, 8 November 2016 to 2 December 2018, assuming that the Malang Pandoll Toll Road was 100% free in 2016, but until the end of 2018 there were several things that made the Pandaan Malang toll road project unable to be completed because the land had not been free in Madyopuro kelurahan section 5 and the discovery of a site now in the toll road body location sta 37 + 700 (KM. 95 + 600).

Table 3. Total Initial Investment Costs

*Analysis of Operational Delay and Additional Investment Costs, As an Investment Consideration: Case in Malang Pandaan Toll Road*

The steps taken are related to the discovery of the current site, namely by coordinating with related site agencies, realignment of toll road tracts and land acquisition in the form of the An-Nuur Asrikaton mosque in Asrikaton sub-district, section 4 located on the toll road body.

Due to the aforementioned matters and the contract expiration with the contractor PT PP (Persero) Tbk, but the project has not yet been completed, the 7<sup>th</sup> work addendum on April 25, 2019 is related to the addition of implementation time and implementation costs but the costs final calculation has not been done related to the volume of work in the field. Likewise with the supervisory contract (PT Virama Karya and PT. Arya Jasa) an extension of time was also added. For PT JMTO (the company that operates the Pandaan Malang toll road for sections 1, 2 and 3 which started operations in August 2019) a new contract with PT. JPM as the owner. In this discussion, all investment costs are in the form of data that has been agreed upon and signed jointly between the owner and contractor or between the owner and supervisor. In addition to the changes above, there are differences in the length of completion of the Pandaan Malang toll road project, which was originally along the section 37. 65 km to 38,488 km.

In this discussion it was also conveyed that toll road revenues starting on August 8, 2019 were only for sections 1, 2 and section 3 along 30,625 km with a tariff agreement from the Government through the BPJT (Toll Road Regulatory Agency). There is a difference in tariffs which in the beginning of the plan, the class of vehicles is grouped into 5 items, while the latest is now grouped in 3 items of vehicles, so there are prices whose tariffs go up and there are prices whose rates go down. The following changes in tariff plans are agreed:

- 1) Group I = Rp. 750 / km to Rp. 898 / km
- 2) Group II = Rp. 1,125 / km to Rp. 1,347 / km
- 3) Group III = Rp. 1,500 / km to Rp. 1,347 / km
- 4) Group IV = Rp. 1,875 / km to Rp. 1,796 / km
- 5) Group V = Rp. 2,250 / km to Rp. 1,796 / km

In addition to construction costs for the construction of the Pandaan Malang toll road, there are also construction costs for the construction of replacement buildings. During the Pandaan Malang toll road construction process, there was a toll road section that affected Government buildings, which we would replace in the other building, where the cost was called the cost of substitute building construction with a total cost of Rp. 176,355,721,800.00.

In the analysis of the Pandaan Malang Toll Road project, investor equity was 30% of the project value or around Rp. 1,791,000,000,000.00 and loans to syndication (cooperation of several Banks) of the banking sector reached 70% of the total project value or Rp. 4,179,000,000,000.00 and Rp. 392,589,392,268.87 total of the bank loan interest both for DTT (Land Bail) and for KI (Investment Credit).

Other costs are Overhead Costs consisting of HR costs (salaries, insurance, bonuses), office rent, vehicles, fuel, office stationery. Total overhead costs during construction (in 2016 - 2019) totaled Rp 35,113,740,432.70.

In addition to the aforementioned costs, Investors must incur a portion of the costs for land acquisition, because the burden of land acquisition costs for the Pandaan Malang Toll Road project is borne by investors for several locations where construction is not yet free, and will be returned by the Government but does not include interest fees bank issued by the contractor as a whole. Land acquisition fee of Rp. 34,772,792,362.00.

Overall investment costs after a delay in land acquisition are listed in Table 4 where the items consist of design costs, construction costs, supervision costs, overhead costs, land acquisition costs and bank interest costs.

Here there is a difference between the initial investment costs and the investment costs of the design related realization, where at the beginning there is a design cost as a separate item, whereas when realization becomes a contract with construction because the contract includes Design and Build and escalation, where at the beginning there is an escalation fee as a separate item, whereas when there is no realization, the investor does not include an escalation fee in the construction contract, so it cannot be billed by the contractor. Whereas if the construction contract has more than 12 months to complete, the owner will escalate the increase annually to the contractor.

Revenues are derived from the product of the volume of vehicles passing the toll road times the applicable toll tariff. The volume of vehicles (LHR) results from planning consultants and toll tariffs per km are agreed by investors and BPJT (Toll Road Regulatory Agency). Aside from the main toll revenue coming from passing vehicles, there are also toll revenues from other sectors. For example, as a rental place for advertisement in several toll roads.

As already stated where there is a delay in the construction of the Pandaan Toll Road project in Malang, referring to it, a sensitivity analysis is carried out by making an alternative to the operational delay time of 5 years and 10 years. Where there is a delay in the completion of the project, it will affect several things such as an increase in investment costs, delay in operating time, and reduced revenue because of the reduced concession period (The zero point in 2017 and the 35 point concession period in 2052).

Table 4. Total Investment Costs Due to Delay

No	Work Item	Amount (Rp)
1	Construction Costs for the Pandaan Malang Toll Road Project	3,877,703,350,295
2	Replacement Building Construction Costs	176,355,721,800
3	Consultant Fees	47,182,103,173
4	Overhead Costs During the Construction Period	35,113,740,432
5	VAT (for costs arising from points 1 to 4 of 10%)	413,635,491,570
6	Land Acquisition Costs	34,772,792,362
7	Costs "Interest during construction"	392,589,392,268
	Realized Investment Costs (Due to delays)	4,977,352,591,901
	Construction Margin	19,909,410,367

*Analysis of Operational Delay and Additional Investment Costs, As an Investment Consideration: Case in Malang Pandaan Toll Road*

Total Realized Investment Costs (Due to delays)

4,997,262,002,269

## Sensitivity Analysis

In this sensitivity analysis, it makes two analyzes namely how the relationship between NPV and income and the relationship between NPV and investment costs of the Pandaan toll road in Malang. Sensitivity analysis is done by changing the year of operational delay from a delay of 1 year, 2 years, 3 years, 4 years, 5 years, 6 years, 7 years, 8 years, 9 years and 10 years. Then the NPV, IRR, and income are calculated.

### The relationship between NPV and income

The relationship between NPV and income, the less income received, the more negative the NPV value. Conversely the higher the income, the NPV is in a positive direction. So when making investment decisions on the Pandaan Malang toll road, the maximum NPV limit equal to Zero generates an income of Rp 165 (millions) as in Figure 3.

### The relationship between NPV and investment costs

The relationship between NPV and investment costs, the greater the investment costs, the more NPV the negative value. Conversely the smaller the investment costs, the NPV is positive. So when making an investment decision on the Pandaan Malang toll road, the maximum limit of zero value NPV requires an investment cost of Rp 8,500,865 (million) as shown in Figure 4.

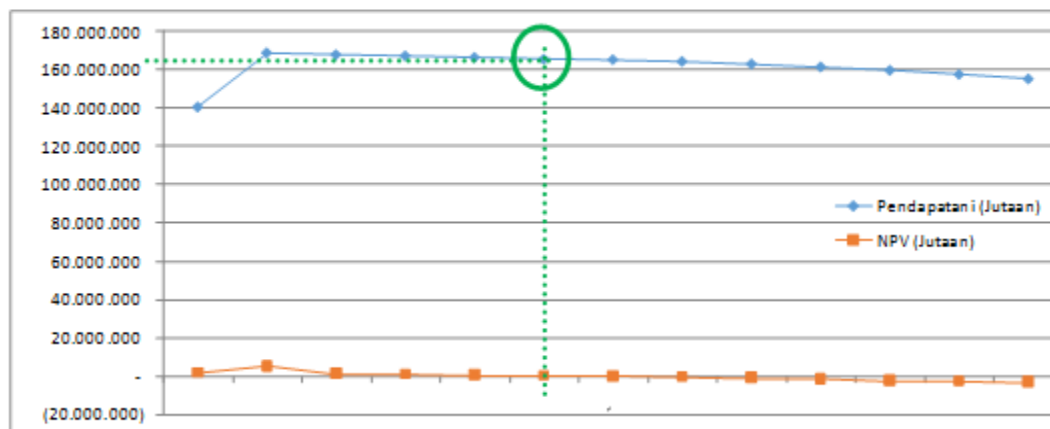


Figure 3. Relationship between NPV and income

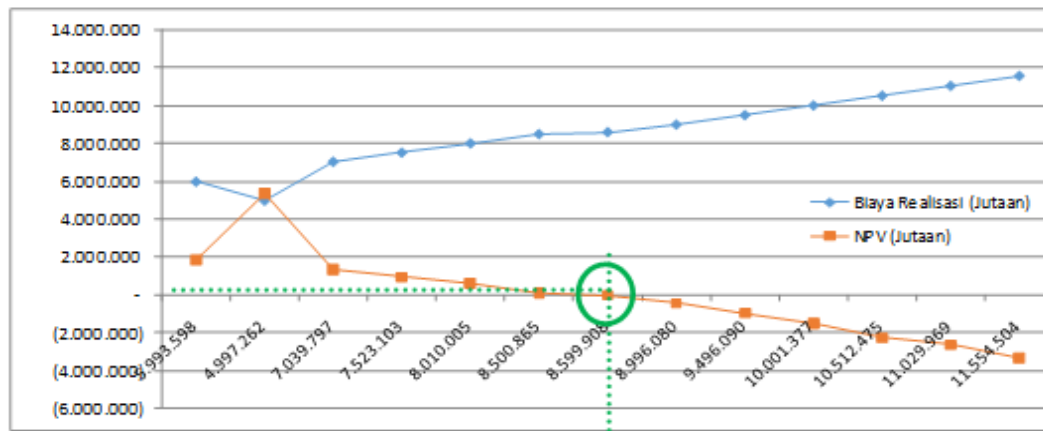


Figure 4. The Relationship Between NPV and Investment Cost

## IV. CONCLUSION

The effect of the delay in operation of the Pandaan Malang toll road (related to the decision to invest), if the investor experiences an operational delay of up to 4 years 1 month (starting from the initial plan in 2019) and has to withdraw from operating at the end of January 2024, then this time is the maximum limit for investment delay. Because more than 4 years and 1 month, NPV will get negative value and smaller IRR.

The effect of the additional investment costs of the Pandaan Malang toll road (related to the decision to invest), that when making an investment decision, the maximum investment cost limit is Rp. 8,599,907 (million). Because if the costs incurred are more than that, the NPV will get zero value and the smaller the IRR.

The greater the investment costs incurred, it will affect the NPV value will be more negative and the smaller the value of IRR and the less revenue obtained. With an investment cost of Rp. 8,599,907 (million), the income earned is Rp. 165 (millions).

## ACKNOWLEDGMENTS

This work has no conflict of interest.

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